

WHAT IS CLAIMED IS:

1. An optical-electrical wiring board, comprising  
an electrical wiring board having a through-hole formed  
therein, and an optical wiring layer laminated on said  
5 electrical wiring board and including a core through  
which the light is propagated and a clad surrounding  
said core, wherein:

10 said electrical wiring board includes an  
electrical wiring formed on a first surface, and  
mounting means for mounting an optical part, said  
mounting means being electrically connected to said  
electric wiring and mounted in the vicinity of said  
through-hole of said first surface, and

15 said core includes a first waveguide for  
propagating the light in a first direction along said  
electrical wiring board and a second waveguide for  
propagating the light in a second direction  
perpendicular to said electrical wiring board, said  
second waveguide crossing the first waveguide and a  
20 part of said second waveguide being arranged within  
said through-hole.

25 2. The optical-electrical wiring board according  
to claim 1, wherein said optical-electrical wiring  
board further comprises a mirror arranged in the  
crossing point between said first waveguide and said  
second waveguide and serving to reflect the light  
propagated through one waveguide toward the other

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waveguide.

3. The optical-electrical wiring board according to claim 2, wherein one end of said second waveguide is exposed to said first surface.

5           4. The optical-electrical wiring board according to claim 2, wherein said optical-electrical wiring board further comprises a light-collecting lens mounted on said first surface.

10           5. The optical-electrical wiring board according to claim 2, wherein said second waveguide is tapered from said first surface toward a second surface opposite to said first surface or from said second surface toward said first surface.

15           6. The optical-electrical wiring board, comprising an electrical wiring board having a through-hole formed therein and an optical wiring layer laminated on said electrical wiring board, wherein:

20           said electrical wiring board includes an electrical wiring formed on the first surface, and mounting means for mounting an optical part, said mounting means being electrically connected to said electrical wiring and arranged in the vicinity of said through-hole of said first surface, and

25           said optical wiring layer includes a core for propagating the light in a direction extending along said electrical wiring board, and a clad surrounding

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said core.

7. The optical-electrical wiring board according to claim 6, wherein said optical-electrical wiring board further comprises a mirror for reflecting the light propagated through said core.

8. The optical-electrical wiring board according to claim 1 or 6, wherein said optical-electrical wiring board further comprises mounting means for mounting an electrical part arranged on said first surface, said mounting means being electrically connected to said electrical wiring.

9. The optical-electrical wiring board according to claim 2 or 7, wherein:

said electrical wiring comprises a plurality of layers, and

connecting means for electrically connecting said plural layers of said electrical wiring is arranged inside said through-hole.

10. The optical-electrical wiring board according to claim 2 or 7, wherein said mounting means is arranged such that, when a light-emitting element or a light-receiving element is mounted on said mounting means, the light-emitting surface of said light-emitting element or the light-receiving surface of said light-receiving element is arranged on the axis of said second waveguide.

11. A mounted board prepared by mounting

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an electric part to the optical-electrical wiring board  
according to claim 1 or 6.

12. A mounted board prepared by mounting  
an electric part to the optical-electrical wiring board  
5 according to claim 2 or 7.

13. A method of manufacturing an optical-  
electrical wiring board, comprising:

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10 the step of forming a through-hole in an  
electrical wiring board having an electrical wiring  
formed on a first surface;

the step of bonding an optical wiring layer  
including a core and a clad surrounding said core to  
a second surface opposite said first surface of the  
electrical wiring board; and

15 the step of forming a mirror in said optical  
wiring layer, said mirror serving to reflect the light  
propagated through said core toward said through-hole  
or to reflect the light passing through said through-  
hole so as to be incident on said mirror toward said  
20 core.

14. A method of manufacturing an optical-  
electrical wiring board, comprising:

25 the step of forming a first through-hole in  
an electrical wiring board having an electrical wiring  
formed on a first surface;

the step of filling said first through-hole with  
a clad;

the step of bonding an optical wiring layer including a first core and a clad surrounding said first core to a second surface opposite said first surface of said electrical wiring board;

5 the step of forming a second through-hole having an inner diameter smaller than the inner diameter of said first through-hole and extending through said electrical wiring board, said first core, and said clad surrounding said first core in a central portion of  
10 said first through-hole;

the step of filling said second through-hole with a second core so as to form a waveguide extending in a direction perpendicular to said electrical wiring board; and

15 the step of forming a mirror reflecting the light propagated through one core toward the other core in a portion where said first core and said second core are allowed to cross each other.

20 15. A method of manufacturing an optical-electrical wiring board, comprising:

the step of forming a first through-hole in an electrical wiring board having an electrical wiring formed on a first surface;

25 the step of filling said first through-hole with a clad;

the step of forming an optical wiring layer including a first core and a clad surrounding said

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first core on a second surface opposite to said first surface of the electrical wiring board;

5 the step of forming a second through-hole having an inner diameter smaller than the inner diameter of said first through-hole and extending through said electrical wiring board, said first core and said first clad surrounding said first core in a central portion of said first through-hole;

10 the step of filling said second through-hole with a second core so as to form a waveguide extending in a direction perpendicular to said electrical wiring board; and

15 the step of forming a mirror reflecting the light propagated through one core toward the other core in a portion where said first core and said second core are allowed to cross each other.

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20 16. The method of manufacturing an optical electrical wiring board according to claim 14 or 15, wherein said method further comprises the step of forming a light-collecting lens in one edge of said second core on the side of said first surface.